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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/686,766	10/17/2003	Tadatoshi Suzuki	57454-982	9824

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EXAMINER	
CORRIGAN, JAIME W	
ART UNIT	**PAPER NUMBER**
3748	

DATE MAILED: 12/17/2004

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary	Application No.	Applicant(s)	
	10/686,766	SUZUKI ET AL.	
	Examiner	Art Unit	
	Jaime W Corrigan	3748	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☐ Responsive to communication(s) filed on _____.

2a)☐ This action is **FINAL**. 2b)☒ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) 1-30 is/are pending in the application.

4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) 1-30 is/are rejected.

7)☐ Claim(s) _____ is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☐ The drawing(s) filed on _____ is/are: a)☐ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12)☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☒ All b)☐ Some * c)☐ None of:

1.☒ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1) ☒ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☒ Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08) Paper No(s)/Mail Date 5-4-04, 3-5-04
4) ☐ Interview Summary (PTO-413) Paper No(s)/Mail Date. _____ .
5) ☐ Notice of Informal Patent Application (PTO-152)
6) ☐ Other: _____.

DETAILED ACTION

Claim Rejections - 35 USC § 102

The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

> A person shall be entitled to a patent unless –
>
> (b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

Claims 1-9 are rejected under 35 U.S.C. 102b) as being anticipated by Hirakawa et al. (PN 6,012,851).

Regarding claim 1 Hirakawa discloses a full-type rolling bearing formed of an outer ring (See Figure 2 (4)), an inner ring (See Figure 2 (3)) and rollers (See Figure 2 (5)) that are made of steel, wherein at least one of said outer ring, inner ring and rollers has a carbonitrided (See Column 3 Lines 52-58) layer in its surface layer, and the austenite (See Column 4 Lines 36-47) crystal grain size number of the surface layer is greater than 10.

Regarding claim 2 Hirakawa discloses at least one of said outer ring (See Figure 2 (4)), inner ring (See Figure 2 (3)) and rollers (See Figure 2 (5))is carbonitrided at a carbonitriding temperature (See Column 3 Lines 59-67, Column 4 Lines 1-10) equal to or higher than the A1 transformation temperature, cooled to a temperature lower than the A1 transformation temperature and then heated to a quenching temperature lower

than said carbonitriding temperature and thereby quenched (See Column 3 Lines 59-67, Column 4 Lines 1-10).

Regarding claim 3 Hirakawa discloses said quenching temperature (See Column 3 Lines 59-67, Column 4 Lines 1-10) is in a temperature range at which carbide and/or nitride and an austenite (See Column 4 Lines 36-47) phase coexist in the carbonitrided surface layer of the steel.

Regarding claim 4 Hirakawa discloses said quenching (See Column 1 Lines 34-53) temperature is 790.degree. C.-830.degree. C.

Regarding claim 5 Hirakawa discloses at least one of said outer ring (See Figure 2 (4)), inner ring (See Figure 2 (3)) and rollers is cold-worked (See Column 1 Lines 10-25) before being carbonitrided.

Regarding claim 6 Hirakawa discloses at least one of said outer ring (See Figure 2 (4)), inner ring (See Figure 2 (3)) and rollers (See Figure 2 (5)), a compression residual stress of at least 500 Mpa (See Column 3 Lines 11-23) is generated.

Regarding claim 7 Hirakawa discloses an outer ring (See Figure 2 (4)) being in rolling contact with a cam shaft (See Figure 2 (7)) of the engine; a roller shaft (See Figure 2 (Not numbered but clearly visible)) located inside said outer ring and fixed to a

cam follower body; and bearing elements (See Figure 2 (5)) placed between said outer ring and said roller shaft, wherein at least one of said outer ring, roller shaft and bearing elements has a carbonitrided (See Column 3 Lines 52-58) layer, and austenite (See Column 4 Lines 36-47) crystal grains in at least a surface layer are made fine to have a grain size number greater than 10.

Regarding claim 8 Hirakawa discloses an outer ring (See Figure 2 (4)) being in rolling contact with a cam shaft (See Figure 2 (7)) of the engine; a roller shaft (See Figure 2 (Not numbered but clearly visible)) located inside said outer ring and fixed to a cam follower body; and bearing elements (See Figure 2 (5)) placed between said outer ring and said roller shaft, wherein at least one of said outer ring, roller shaft and bearing elements has a carbonitrided (See Column 3 Lines 52-58) layer and has a fracture stress (See Column 3 Lines 11-23) of at least 2650 MPa.

Regarding claim 9 Hirakawa discloses an outer ring (See Figure 2 (4)) being in rolling contact with a cam shaft (See Figure 2 (7)) of the engine; a roller shaft (See Figure 2 (Not numbered but clearly visible)) located inside said outer ring and fixed to a cam follower body; and bearing elements (See Figure 2 (5)) placed between said outer ring and said roller shaft, wherein at least one of said outer ring, roller shaft and bearing elements has a carbonitrided (See Column 3 Lines 52-58) layer and has a hydrogen content of at most 0.5 ppm.

Claim Rejections - 35 USC § 103

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

Claims 10-30 are rejected under 35 U.S.C. 103(a) as being unpatentable over Hirakawa et al. (PN 6,012,851) in view of Schmidt et al. (PN 5,775,280).

Hirakawa et al discloses the invention as recited in claims 7-9 above, however, fails to disclose a bifurcated rocker arm to operate an engine valve; a cam follower body with two sidewalls; a rocker arm operating an interlocking rod; bearing elements are needle bearings; a roller shaft with variable hardness; the roller shaft has a caulked end; a press-formed follower.

Schmidt teaches that it is conventional in the art to utilize said cam follower body is mounted on one end of a rocker arm (See Figure 2 (1)), said rocker arm is pivotably attached to a rotational shaft (See Figure 1 (6a)) located between said one end and the other end, one end of an open/close valve (See Figure 2 (5)) of said engine abuts on said other end, said cam follower body on said one end has a bifurcated (See Figure 4 (13)) roller supporting portion, and said roller shaft is fixed to said bifurcated roller supporting portion; said cam follower body is mounted between one end and the other end of a rocker arm (See Figure 2 (1)), said roller shaft is fixed in a roller hole extending between two sidewalls of the rocker arm, an end of an open/close valve of said engine abuts on said one end of said rocker arm, and a pivot (See Figure 2 (2),

(4)) abuts on said other end; a rocker arm is pivotably attached to a rotational shaft (See Figure 1 (6a)) located between one end and the other end of said rocker arm, an end of an open/close valve (See Figure 2 (5)) of said engine abuts on said one end, said other end abuts on one end of an Interlocking rod (See Figure 3 (13)) transmitting a stress from said cam, said cam follower body is mounted on the other end of said interlocking rod, said one end (See Figure 3 (15)) and said other end (See Figure 3 (12)) of said interlocking rod being located respectively on said rocker arm and said cam, and said roller shaft (See Figure 2 (6a)) is attached to said cam follower body and abuts on said cam; said bearing elements are full type needle bearings (See Figure 1 (6b)); said roller shaft (See Figure 2 (6a)) has its end with a hardness lower than that of its central portion; said roller shaft (See Figure 2 (6a)) has its end which is caulked; said cam follower (See Figure 2 (1)) is entirely press-formed.

It would have been obvious to one having ordinary skill in the art at the time the invention was made to have utilized the rocker arm taught by Schmidt in the Hirakawa device since it would improve valve timing control.

Conclusion

The prior art made of record and not relied upon is considered pertinent to applicant's disclosure. Takemura (PN 6,095,692), Sweetnam et al. (PN 6,532,920) disclose similar cam followers.

Any inquiry concerning this communication from the examiner should be directed to Examiner Jaime Corrigan whose Carlyle telephone number is (571) 272-4858. The

examiner can normally be reached on Monday - Friday from 8:30 a.m. – 6:00 p.m. 2nd Friday off.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Thomas E. Denion, can be reached on (571) –272-4859. The fax number for this group is (703) 872-9306.

Any inquiry of a general nature or relating to the status of this application or proceeding should be directed to the Group receptionist whose telephone number is (571) 272-3700.

JC

Jaime Corrigan
Patent Examiner

December 13, 2004

Art Unit 3748

THOMAS DENION
SUPERVISORY PATENT EXAMINER
TECHNOLOGY CENTER 3700